Public support for the deployment of next generation access networks—Common themes, methodological caveats and further research

1. Rationale for a special issue

Next generation telecommunications infrastructures are considered as a principal example of a new technology for sustainable economic growth. From their deployment it is expected that a wealth of innovations – hopefully converted into economic growth – new sources of employment and improved quality of life will result. In line with these prospects, public administrations at supranational, national, regional and local levels have encouraged the development of these new infrastructures. Moreover, in times of economic crisis, public assistance to deploy such networks encompasses the promise of placing a weak economy on the road to prosperity. However, such arguments and political claims clearly require rigorous assessment. In particular, any such assessment must adequately address the appropriate form of modelling that best captures key elements for identifiable progress from next generation access networks (NGAN).

Precisely, an assessment of the public support options for NGAN deployment is the main objective of this special issue. In addition, the issue aims to provide a theoretical, factual and analytical basis for the development of economic models behind NGAN deployment. With this objective in mind the editors of the issue have sought papers to draw lessons from a representative set of existing cases, with a view to fostering informed debate on alternative policy options and their likely impact.

2. Common themes across this special issue

How best to support NGAN deployment has turned out to be the central question examined in the contributions to the special issue.

Arguably, the most interesting topic raised in the issue is the complete change of paradigm for the deployment of NGAN. Now the public support is seen as not only responsible for the regulatory framework where market forces thrive, but as the leading force behind infrastructure deployment and innovative boosting measures, a change already anticipated in a previous special issue of *Telecommunications Policy* (Gómez-Barroso & Feijóo, 2010a). And maybe even more important, this special issue is a confirmation of the direct involvement of public administrations in the deployment of NGAN: it is happening right now in many areas of the world and at national (see the papers from Choi; Ragoobar, Whalley, & Harle; Gómez-Torres & Beltrán; and Ruhle et al.), regional (see the paper from Ganuza & Viecens) and local levels (see the paper from Troulos and Maglaris; and Tahon et al.). And it only seems that the interventions are growing more ambitious as most of them are considered as success stories—at least for the moment.

One of the main reasons for this enormous shift lies undoubtedly in the success of some Asian countries in the deployment of NGAN, as the paper from Choi in this issue highlights comparing the cases of South Korea and the USA. In fact, Gómez-Torres and Beltrán use also this South Korea case as a benchmark for broadband development plans in Colombia. From this Asian experience it could well happen, as Choi's paper suggests, that the "ladder of investment", implemented first in the USA –and then abandoned – and still mostly in place in the EU, should be turned upside down, instead of tinkering with the rungs as suggested for instance in Cave (2010). Therefore it would be interesting to research on how and when this other model where government intervention is prime has spread from these countries to the rest of the world, if this is the case. An initial identification of these "policy patterns" is precisely the objective of the paper from Ruhle et al. in the issue. However, it would be also interesting to understand why, on the other hand, the mobile broadband model in Asia, such as i-mode (Lindmark & Bohlin, 2003), was mostly a failure when exported to other countries.

Having said that, it is obvious that the recipes of one country cannot be immediately translated into another and a majority of papers in the issue insist on the relevance of country – or even regional – specificities. Thus, Ragoobar, Whalley, and Harle find different cases to support public intervention between the UK, Sweden and the Netherlands in spite of their

similarities, leading to different potential decisions about the scope of this intervention. Gómez-Torres and Beltrán use the cases of South Korea, the Netherlands and New Zealand to find the right combination of policies in the case of Colombia, but they add the peculiarities of the Colombian broadband market to arrive at meaningful measures. Ruhle et al. find common policies when comparing national plans but also significant differences in practical approaches. Troulos and Maglaris also find these differences in a wider sample of EU municipal initiatives and, therefore, argue for their consideration when deploying NGAN with public support. Ganuza and Viecens explain in detail the Catalonian case in Spain, again with many particularities of interest.

The administrative level of decision is another main topic in the issue. Is public intervention at the municipal level more efficient than at national or regional levels? This is an area still void of a solid theoretical framework, but the paper from Troulos and Maglaris in this issue shows that the national particularities are among the main determinants of the type of municipal involvement. Thus, there are considerable differences even inside the EU where the regulatory framework is common and accounts for the principle of subsidiarity (Kelly, 2004). Even more, some regional experiences are difficult to translate inside the very same country, as Ganuza and Viecens point out.

In spite of the close attention given to direct public interventions, many of the papers in the issue also address regulatory issues. To this regard, there seems to be a wide agreement on current frameworks being insufficient to cater for the peculiarities of direct public intervention at several levels of administration—the current frameworks more suited to nationwide markets and incumbent operators, specifically the one of the EU. In particular, Troulos and Maglaris ask for adjustments to handle emerging access monopolies at regional and local levels. Ganuza and Viecens also tackle the regional level. Choi suggests that cable networks could have been subject to unbundling obligations to create a more symmetric regulatory model. Ragoobar, Whalley, and Harle ask for early regulation of NGAN roll-out. Gómez-Torres and Beltrán reiterate the need for a holistic approach including demand and expectation from users. Tahon et al. show that broadband wireless access at municipal level could deserve a distinct regulatory treatment. Ruhle et al. suggest that regulation should be subject to policy aims. Charalampopoulos, Katsianis, and Varoutas investigate the relationship between regulatory scenarios and investment decisions. Finally, and more radically, Brito, Pereira, and Vareda claim that there are circumstances where no regulation at all fosters investment and does not reduce the existing level of competition.

Linked in some way to regulatory issues, another relevant conclusion from the issue refers to the role of the different technologies in the achievement of ultra-broadband penetration goals. The role of cable television networks (HFC) has been generally neglected in the past, with minor exceptions (Van Eijk, 2009). However, it has been shown that facilities-based competition has a significant positive impact on broadband penetration (Picot & Wernick, 2007), as Choi also reminds in her paper. Just the simple upgrade of cable networks to DOCSIS 3.0 allows a relevant number of users in these networks to achieve speeds of 50 Mbps, enough for many next generation policy goals. Along the same lines, wireless access could be more efficient in economic terms as the mean to provide the final stretch of NGAN, an argument raised by Tahon et al. in their paper.

Finally, it is worthy to note that, in spite of the supply-side focus of the special issue, the uncertainties about the demand are emphasised in several papers, thus arguing for more integrated approaches and not just the simple deployment of NGAN. This is the case, for instance, of the paper of Ragoobar, Whalley, and Harle for several countries of the EU, and also the paper from Gómez-Torres and Beltrán in the case of Colombia. The need for a combination of policies was already anticipated in Gómez-Barroso and Feijóo (2010b). The impact of the economic crisis in the capacity of expenditure of public administrations has led also to look for the best conditions for the public investment. Ganuza and Viecens examine this aspect in their paper and provide some guidelines for the public investment in an EU regional case.

3. Methodological caveats and further research

The choice between short-term and long-term market efficiency lies also at the bottom of the debate on the best model for direct public intervention into the deployment of NGAN. On one side, there is an obvious risk of duplicative investments in NGAN—public and private. On the other, we could be talking about digital divides or about a "re-monopolization" of communications networks, Australian-style (Given, 2010). The rationale for public intervention (the "why" question) is stated in the paper from Choi: investments in NGAN facilities create long-term efficiency in general terms and, therefore, contribute to achieve higher overall welfare for society. This is also the argument of Ganuza and Viecens since investments in NGAN may increase productivity in the long run but also economic recovery in the short term, a discourse also recalled in the paper from Ruhle et al.

How cogent are these arguments? From a methodological perspective, there is a main and obvious difficulty to analyse the success or failure of public support for the deployment of NGAN: lack of time long-enough data. We are witnessing the emergence of ultra-broadband networks but take-up is still rather low in general. Therefore researchers of the area have to rely mostly on methodologies not based on quantitative data – econometrics typically – to find the appropriate causality relationships. This is highly relevant since for conventional broadband there is an increasing amount of works which relate socio-demographics, lifestyles, and institutional aspects with the adoption of broadband (see for example Bouckaert, Van Dijk, & Verboven, 2010, or Drouard, 2010). Also the impact of broadband in macroeconomic figures – growth, productivity – starts to be solidly established (see WSIS Lab Team, 2010, for a summary of studies, or Koutroumpis, 2009). However, the temptation of "joyfully" extending the results from broadband to ultra-broadband may prove considerably wrong (Kenny & Kenny, 2011).

Unfortunately, there are not many other methods to extract general and valid conclusions when enough data sets are not available. To overcome this difficulty, researchers in the area use qualitative tools such as case studies (Choi; also Ganuza & Viecens), surveys, benchmarking and comparison of initiatives among different countries (Troulos & Maglaris; also Gómez-Torres & Beltrán; or Ruhle et al.), structured interviews (Ragoobar, Whalley, & Harle; also Troulos & Maglaris; and Ganuza & Viecens) and discussion of existing regulations (Brito, Pereira, & Vareda; Charalampopoulos, Katsianis, & Varoutas). However these methodologies only lead, for the moment, to particular results difficult to extrapolate into general policies and, moreover, they are very dependent on each country specific circumstances.

A different approach would be to enjoy a theoretical framework where public direct intervention is taken into account. There are a number of initiatives in this direction. Two of them are rather promising: real options and game theory. In the special issue Tahon et al. use game theory to construct a scenario of multiple providers of broadband wireless access public and private, whereas Charalampopoulos, Katsianis, and Varoutas use real options to determine the investment decisions in NGAN of an incumbent regulator in the presence of several regulatory regimes.

However, and as a final conclusion, in general the existing theoretical approaches fall short of achieving results close enough to a complex reality and valid in ample circumstances. Therefore, and this is good news for the academia, wider and deeper research in this area is still greatly needed.

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Claudio Feijóo*
Research Centre for Applied ICTs (CeDInt), Technical University of Madrid, Campus de Montegancedo, Pozuelo de Alarcón, ES-28223 Madrid, Spain
E-mail address: cfeijoo@cedint.upm.es

José Luis Gómez-Barroso
Department of Applied Economics and Economic History, UNED—Universidad Nacional de Educación a Distancia, P° Senda del Rey11, 28040 Madrid, Spain
E-mail address: jlgomez@cee.uned.es

Erik Bohlin
Division of Technology & Society, Department of Technology Management & Economics, Chalmers University of Technology, Vera Sandbergs Allé 8, S-41296 Gothenburg, Sweden
E-mail address: erik.bohlin@chalmers.se